SECTION 5

IDENTIFICATION AND DEVELOPMENT OF OE RESPONSE ACTION ALTERNATIVES

5.1 INTRODUCTION

The identification of alternatives for the 312-acre parcel at JPG includes two principal groups and several variations. The first group of alternatives includes non-intrusive approaches while the second group of alternatives includes intrusive approaches. Non-intrusive alternatives are comprised of the No DOD Action Indicated (NDAI) and institutional controls alternatives while intrusive approaches include surface and subsurface clearance activities.

5.2 DESCRIPTION OF OE CLEARANCE TECHNOLOGIES

5.2.1 Introduction

Various technologies and approaches exist for the clearance of OE. An OE clearance operation falls into three distinct areas: detection, recovery, and disposal. A discussion of the techniques used in each of these areas is presented in the following paragraphs.

5.2.2 OE Detection

5.2.2.1 The detection of OE includes those methods and instruments that can be used to locate OE. The selection of the best technology depends on the properties of the OE to be located, including whether the ordnance is found on the surface or below the surface, and the characteristics of the location where the OE is located, such as topography, vegetation, and geology.

5.2.2.2 Detection technologies have two basic forms. One form, visual searching, has been successfully used on a number of sites where OE is located on the ground surface. When performing a visual search of a site, the area to be searched is divided into five-foot lanes which are then systematically inspected for OE. A metal detector is sometimes used to supplement the visual search in areas where ground vegetation may conceal OE. Typically, any OE found during these searches is flagged or marked on a grid sheet for later removal.

5.2.2.3 The other form of OE detection, geophysics, includes a family of detection instruments designed to locate OE. This family of instruments includes magnetic instruments, electromagnetic instruments, and ground penetrating radar. Each piece of equipment has its own inherent advantages and disadvantages based on its operating characteristics, making the selection of the type of geophysical instrument to be used on an OE survey key to the success of the project. Nevertheless, geophysics is the most cost-effective method of conducting OE surveys. The equipment designed for OE geophysical surveys is lightweight, easily maintained, and very effective. However, there are limitations to geophysics. Geophysical equipment cannot usually distinguish OE items from other metallic objects located below the surface. “Cultural interference,” such as underground utility lines, construction debris, or metal bearing rock can deliver a signature to the equipment similar to OE. Therefore, it is necessary for the geophysical survey team to carefully document any known cultural interference while in the survey area. Another limitation to the equipment is that metallic objects have to be much larger when at greater depths so that the geophysical equipment can obtain a reading. For instance, in the case of the EM31 (an electromagnetic instrument) its magnetic field can extend to a depth of 18 feet. However, 50% of its signal strength is used in the first foot of material below the ground surface.

5.2.2.4 Various pieces of geophysical equipment were used during the OE EE/CA field investigation at the 323-acre wooded site. This equipment included the Portable STOLS? and the Foerster Ferex MK-26 dual tube fluxgate gradiometer. While the technical characteristics and operating parameters of each of these pieces of equipment varied greatly, each was found to be effective in various applications of the field investigation. In general, the equipment was able to identify magnetic anomalies at depths greater than four feet based on the number of intrusive investigations performed where nothing was found to that depth.

5.2.3 OE Recovery

5.2.3.1 Once a site has been surveyed by either visual or geophysical means, the recovery of OE can begin. Recovery operations can take the form of a surface-only clearance of OE, an intrusive (subsurface) clearance of OE, or a combination of the two. The decision on the level of clearance operation to engage in is based on the nature and extent of the OE contamination as well as the future use of the site.

5.2.3.2 During a surface clearance operation, exposed OE or suspected OE are identified during the detection phase. Then the OE are inspected, identified, and transported to a designated area for cataloging and eventual disposal. If it is determined during the OE inspection that the item cannot be safely moved, then it may be necessary to destroy the OE item in place.

5.2.3.3 During a subsurface clearance operation, buried OE or suspected OE identified by the geophysical survey or other detection methods requires excavation for removal. Because the actual nature of the buried OE item cannot be determined without it being uncovered, non-essential personnel evacuations are necessary, as well as, perhaps, the use of engineering controls to ensure the safety of the operation. The excavation of the OE item then takes place with either hand tools or mechanical equipment depending on the suspected depth of the object. Once the OE item has been exposed, it is then inspected, identified, and transported to a designated area for cataloging and eventual disposal. If it is determined during the OE inspection that the item cannot be safely moved, then it may be necessary to destroy the OE item in place.

5.2.3.4 Evacuations are sometimes necessary when conducting intrusive investigations to minimize the risk of the operation. An evacuation area is calculated by USAESCH based on the potential explosive force that could be encountered during an excavation. An evacuation distance is then calculated to ensure that all non-essential personnel are outside of that distance during the conduct of the excavation. For the 323-acre wooded site project, this evacuation distance was calculated to be 1200 feet (366 meters). Engineering controls can be developed to reduce this evacuation distance. Every possible option will be explored to minimize potential evacuations with the exception of compromising public safety.

5.2.4 OE Disposal

5.2.4.1 Disposal of recovered OE can take one of three different forms: off-site demolition and disposal; remote, on-site demolition and disposal; and in-place demolition and disposal. The decision regarding which of these techniques to use is based on the risk involved in employing the disposal option, as determined by the specific area's characteristics and the nature of the OE recovered.

5.2.4.2 If transported off-site for destruction, the OE would be transported by either Army personnel or by a qualified UXO contractor. The OE is typically transported to an active military installation where it can be safely destroyed. The transportation of OE is performed in accordance with the provisions of 49 CFR 100-199, AR 55-355, and applicable state and local laws. A Transportation Plan detailing the route and procedures used during the transportation is prepared and approved prior to engaging in any off-site OE transport to ensure all safety aspects of the movement have been addressed. Off-site transportation of OE for destruction was not necessary during this investigation.

5.2.4.3 If OE is discovered in close proximity to occupied buildings it may not be possible to safely destroy the OE item in place without the use of engineering controls. If the OE item is safe to move, it can be moved to a remote part of the project site where demolition and disposal can safely take place. A countercharge can be used to destroy the OE item or the OE item can be burned as a means of destruction. Burning an OE item is not as desirable as a countercharge, however, as the burning can produce secondary explosions or the item may not be completely destroyed, thus leaving the OE item in a more dangerous state than it was originally.

5.2.4.4 Finally, an OE item may be destroyed in place. This technique is typically employed when the OE item cannot be safely moved to a remote location or if the OE items are located in an area that is sufficiently remote. When employing this technique, procedures similar to those described above are used that will detonate the OE item or apply sufficient pressure and heat to neutralize the hazard. When this technique is employed, engineering controls such as sandbag mounds and sandbag walls over and around the OE item are often used to minimize the blast effects. The OE item recovered from the 323-acre wooded site was destroyed in this manner because of the remote nature of the site.

5.3 DESCRIPTION OF RESPONSE ACTION ALTERNATIVES

5.3.1 Introduction

5.3.1.1 The alternatives identified in this section have been selected based on the results of the investigations conducted to date as well as available OE detection and disposal technology currently available. Each alternative, if implemented, must have the ability to achieve the response action objectives. For the response action at the 312-acre parcel, four alternatives have been developed. These alternatives include:

?? Alternative 1 - NDAI;
?? Alternative 2 - Institutional Controls;
?? Alternative 3 - Surface Clearance of OE; and
?? Alternative 4 - Surface and Subsurface Clearance of OE to Depth.

5.3.2 Alternative 1 – No DOD Action Indicated

Alternative 1 would involve no further remedial action at the 312-acre parcel. The site would be available for transfer by lease or sale through TECOM with the standard terms and conditions used in previous transactions involving land with a history of OE.

5.3.2 Alternative 2 – Institutional Controls

Alternative 2 would entail the development of additional institutional controls beyond those currently used by TECOM for property transfers. This alternative would consist of various public awareness components as described in the Institutional Analysis Plan included as Appendix E. These components include printed media, an ad-hoc committee, classroom education, visual media, exhibits/displays, and information posted on the JPG website.

5.3.3 Alternative 3 – Surface Clearance of OE

5.3.3.1 Alternative 3 would entail a surface clearance of OE (including the first foot below the ground surface). In the first phase of this clearance, a land surveyor would establish control points for a grid system. Brush clearing crews would clear enough undergrowth so that the surface clearance crews could adequately perform their work. Surface clearance would be completed by experienced UXO-qualified personnel who would visually search the ground surface for any OE. In addition, UXO-qualified personnel would also use metal detection devices to ensure that any OE items that may exist under the existing ground cover is located during the sweep. The UXO-qualified personnel would perform their sweep in lanes five feet wide, or some other comparable width depending on the sweep reach of the type of metal detection equipment used, to ensure complete surface coverage. All metallic contacts on the ground surface would then be visually identified.

5.3.3.2 Any OE located during the sweep would be inspected to ensure its stability. During this inspection, a determination would be made whether the uncovered OE item is stable based on an EOR. If necessary, engineering controls would be used to minimize the need for evacuation of the public. All inert OE items or other OE-related scrap would be removed from the area and transported off-site for disposal.

5.3.4 Alternative 4 – Surface and Subsurface Clearance of OE to Depth

5.3.4.1 Alternative 4 includes the surface and subsurface clearance of OE items to depth. Intrusive investigations would be conducted at each anomaly location until the anomaly is identified or until a depth of four feet has been reached. If the anomaly is not identified within the first four feet and the geophysical instrument continues to give a signal, USAESCH would be contacted to determine whether to investigate deeper than four feet. The EE/CA field investigation, as well as the OE investigation at the adjacent airfield, showed a vertical profile that indicates that the typical depth of penetration of OE items is less than two feet. Therefore, it is not expected that many locations will require excavation to the full four feet and even fewer locations, if any, would require consideration of excavation beyond four feet.

5.3.4.2 Land surveying and brush clearing operations would be necessary as described in Alternative 3. Unlike Alternative 3, this alternative would be conducted in two phases: an investigation phase and a subsurface clearance phase. Both phases of this alternative would be performed by experienced UXO-qualified personnel.

5.3.4.3 During the investigation phase, a metal detection device capable of performing both the surface sweep and the subsurface survey will be used. In this way, both the surface and subsurface surveys can be performed simultaneously, saving the government time and money. The primary difference in performing this kind of survey over that described in Alternative 3 is that, instead of performing an immediate visual identification of all anomalies identified during the survey, a marking/locating system must be used to be able to relocate the subsurface anomaly at a later date to perform an intrusive investigation. All surface anomalies discovered during the performance of the survey would be immediately identified and removed from the area to ensure that only subsurface anomalies remain at the site.

5.3.4.4 The second phase to this alternative includes the intrusive investigation of all subsurface metallic anomalies identified during the metal detection survey to determine their exact nature. During this intrusive investigation phase, engineering controls may have to be used to decrease the evacuation distance that will be required during the conduct of these investigations. Evacuation distances are determined by USAESCH based on the "maximum credible event" (MCE) or worst case scenario of the potential detonation of an ordnance item that could be found at the site. All non-essential personnel are evacuated this distance from the excavated area based on the MCE to maximize the safety of the operation. In the case of the 323-acre wooded site, the evacuation distance used during the intrusive investigations conducted during the EE/CA field investigation was 1200 feet (366 meters). Engineering controls can be used during subsequent OE investigations that can decrease this distance. During the intrusive investigation, each anomaly is excavated until the source of the magnetic reading is identified.